An inaugural dissertation
On
the Physiology and Pathology of the Stomach.
by
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Diversified as may be the subjects for an inaugural dissertation, none more fairly claim attention, or open a field for more interesting and philosophic enquiry, than the Physiology and pathology of the Stomach. The importance of this organ, its extensive influence over the whole animal oeconomy in health and disease, certainly is a subject well calculated to arrest the speculations of the philosophic and practical physician. If facts form the basis of sound reasoning, we must allow to the stomach a supremacy over all the viscera. It is the most universal of all, and (as a rational deduction) the most indispensably necessary to animal life. Instances of human foetuses born destitute of a brain or heart, or lungs or liver, or some other organ, are familiar, but where will we find one, in which the stomach was found wanting? In some animals indeed, for instance Zoophytes, Hydatids and Polypi, no other animating viscus is discoverable. The Polypus, which is classed in the lowest order of being and considered as forming the connecting link between the animal and vegetable creation, has for a stomach, a simple cavity, into which its food

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is received, and from which it is afterwards disgorged. As we rise to the higher classes of animals we find the digestive apparatus becoming more complicated. From a straight tube, it becomes more or less convoluted, its length increased many times that of the body, and having added to it many subsidiary organs for the proper performance of its functions. In fine, the fact of the stomach being an inseparable incident to every grade of animal life, seems beyond the reach of sophistry. All parts of the body, feel its salutary and invigorating influence when in health, and when deranged, all participate in its derangement. "Languido ventriculo, omnia languent."

The anatomy of this organ is most interesting. We find it joined in a circle of nervous communication with all the viscera of the Thorax, Abdomen and pelvis, itself forming, as it were, the centre. The eighth pair of nerves (from their extensive distribution commonly denominated the Par vagum) which are the peculiar nerves of the stomach, communicate freely with the sympathetic, and have moreover, connexions almost

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as extensive as this great nerve itself — to the oesophagus, pharynx and larynx, to the lungs and vessels of the heart, to the liver, spleen, duodenum &c are distributed branches of the par vagum. The stomach then we see occupying the central situation of a most complicated structure, and maintaining a chain of sympathies more exquisite even than the brain itself. But it is not to the knife of the anatomist that we must look for a discovery of the whole importance of the stomach; it is in the living system where we behold those nice connexions of cause and effect, and those wonderful trains of associative motions, that this fact is fully developed. We here behold it maintaining an intimate relationship with the whole animal machine, invigorating and imparting tone to it when in health, and when disordered, giving origin to a multiplicity of diseases, truly wonderful. Why nature should be thus partial in the exalted station she has given to this organ, we may conjecture from its office of preparing nourishment for the whole system. A desire for food, considered by some as coeval with the rudiments of the foetus, is certainly the first impulse

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stimulating to action the new born babe; and among the most wonderful operations of nature, is to be classed that for which the stomach seems designed. That we live in an age remarkable for its advances towards the perfection of Literature and the Arts, examples of every day abundantly testify. Nor is the improvement lately suggested in the Physiology of the stomach, to be classed among those productions of a speculative genius, which throw an illusory light over the dark and intricate paths of science, that gradually disappearing, leaves the succeeding darkness more visible than before. The process of digestion has at various times been accounted for in various ways. The first theory that enlisted popular opinion, was that which imputed it to a putrefactive process, supposing the food to undergo the same changes in the stomach, that warmth and moisture effect upon it out of the body. The next theory suggested, accounted for this operation on physical principles, or which supposed the muscular coat of the stomach wrought mechanically on the food contained within it. Chemistry was next called ~~[illegible]~~ in to furnish a still more plausible doctrine, and digestion then became

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[illegible] chemical. Two second centuries ago Van Helmont [illegible] [illegible], and for years past the rational conception of the most eminent Physiologists on this point has been, that digestion so far as the stomach is concerned is performed by the solvent powers of the gastric juice secreted by the organ thickly [illegible] into what is termed chyme; this chyme, propelled by the stomach into the duodenum and there combined with the Hepatic and Pancreatic secretions, assumes new characteristics, a portion of which [illegible] is termed chyle. This chyle taken up by the lacteals of the intestines is conveyed along the thoracic duct, which [illegible] finally to the left subclavian vein. The idea of digestion being performed by a solvent power was first suggested by Hippocrates. But upon the experiments of Spallanzani and others the evidences for this theory vanished away. The observations of Hunter, who in the case of a man accidentally [illegible] having a hardly more than an orifice in the great end of the stomach, and [illegible] it was washed by the gastric juice, have a tendency to confirm the opinions above advanced. But this theory, however old, may be, will no doubt

[illegible] [illegible] to show the [illegible] of [illegible] [illegible] to it. In a small [illegible] nutrition [illegible] [illegible] [illegible] it has been shown to the [illegible] [illegible] circulation [illegible] [illegible] [illegible] more than vegetable [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] respect, that [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] the [illegible] juice of [illegible] so far from the [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] is not [illegible] [illegible] [illegible] [illegible] effect [illegible] [illegible] [illegible] [illegible] [illegible] principles [illegible] by the [illegible] the stomach and [illegible] [illegible] [illegible] [illegible] through it. [illegible] of [illegible] [illegible] [illegible] [illegible] [illegible] it thus undergoes [illegible] [illegible] [illegible] [illegible] [illegible] its [illegible] [illegible] by the [illegible] [illegible] [illegible] [illegible] matter, [illegible] [illegible] [illegible] [illegible] [illegible] the circulation; [illegible] [illegible] [illegible] of the [illegible] [illegible] by the [illegible] [illegible] of the stomach and [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] it undergoes still more [illegible] changes; [illegible] [illegible] [illegible] [illegible] [illegible] and [illegible]-

ed by them into chyle. In support of this theory the arguments advanced are ingenious and conclusive. The crucial physiological experiment of which we have an account, is the division of the eighth pair of nerves. This experiment has been performed by many of the ancients and repeated by many modern Physiologists. Among the latter the experiments of Philip made on this nerve with reference to its effects on the stomach, are exceedingly interesting and abundantly demonstrate the identity of the nervous influence and peristalsis. By these experiments it is shewn that a division of the eighth pair of nerves at once deprives the stomach of its power of digestion, but that by exciting the ends of these nerves with a little lime or another stimulant by means of a galvanic battery, the powers of digestion are restored, and, with due allowance for the difficulty of supplying the fluid in proper proportion, exactly as when any division was made. So far then as the identity of the nervous influence and peristalsis is concerned, it seems to be established beyond the advocates for solution by the gastric juice. The question point of difference regards the mode of action of the galvanic

juice. By one party it is maintained that this peculiar fluid [illegible] the nerves of the stomach, acts merely as a stimulant to this organ, promoting the secretion of the gastric juice: by the other, that it is mixed with the contents of the stomach, preventing an animal decomposition. It would be an unnecessary expenditure of time to recount the arguments by which this new theory is maintained especially as the work containing them is accessible to any one. Suffice it to say, as well as superficial reason will admit, that the support of this idea, is in the [illegible] — is its absorption by the veins of the stomach: similarity of structure presuming similarity of function — the veins of the intestines absorb, and why not those of the stomach? The work is redeemed from the consider[able] insignificance, [illegible] on this subject, necessitating a [illegible] it. Nature moreover is redeemed from the reflection of adopting means inadequate to the performance of the end designed — the thoracic duct, hitherto considered as the only medium through which nourishment is conveyed into the system, a small and delicate duct, traversing an extent greater than any other duct in the body and exposed to a variety of accidents, is found

to convey only a part and that a small part of this nourishment. Upon the whole I think it will be found after a careful and impartial inquiry, that the doctrine in question is strongly supported by reason and analogy, and is not conclusive in the minds of some, should at least direct further enquiry.

After this cursory and imperfect glance at the physiology of the stomach, I will attempt a brief notice of its pathology. Brief it must be, as the limits to which I am confined will not allow of a longer investigation. That diseases do originate in the stomach is evident, first, from their being preceded by symptoms indicative of gastric distress; secondly, from them being applied directly to the stomach removing these diseases; and thirdly, from dissections showing a morbid derangement of this organ: the last test however cannot often be resorted to, for it has been remarked by one of the most distinguished anatomists of the age, that organic affections rarely take place in the organic seat of disease but in organs remote and which most sympathize with the part affected: for example, in dyspepsia, when the stomach is originally affected, organic derangement will be met with

in the liver, lungs or brain — parts which most sympathize with the stomach. Before proceeding farther in this part of my subject it may be proper to premise, that to enter into a consideration of the whole catalogue of diseases which from the present imperfect state of pathology can be mainly demonstrated as originating in the stomach, would be to detail a large proportion of the most serious diseases to which mankind are liable. It will be necessary therefore for me to confine my remarks to a few of the most prominent of these diseases. And first Dyspepsy will claim a few moments consideration. Whether we regard the variety, consequences or connexions this with other diseases, none are of greater importance. Beginning from simple and apparently unimportant deviations from health it gradually undermines every power of the system. Its origin can be distinctly traced to causes acting primarily or secondarily on the stomach. It is not my design to enquire what these causes are. Indigestion has been divided into three stages. The first stage is marked by symptoms denoting derangement of the stomach and bowels, as flatulence, acid-

ity, distention after sleep, nausea, general malaise, costiveness and whose alternately, a vitiated secretion of bile &c. The second or the inflammatory stage is brought on by the constant irritation of acid, indigested matter in the stomach, causing it to take on a low degree of inflammation, and being accompanied with an inflammatory tendency throughout the system which is apt to show itself chiefly in those organs most sympathetic with the stomach. The third stage is marked by organic affections in other parts. These will be briefly noticed. From the fact of juxtaposition being a powerful means for the propagation of disease, we are not surprized to find the liver the first part to suffer from any derangement of the stomach. Accordingly in the first stage of indigestion, a more or less vitiated secretion of bile is enumerated among the symptoms. Still farther advanced in the second stage, there is pain in the epigastrium, gradually extending downward till finally the right hypochondrium becomes full and tender on pressure. In a word the symptoms now present, plainly indicate inflammation of the liver. This is an important step in the progress of the disorder from

the importance of the organ now affected. It was mentioned while speaking on the physiology of the stomach, that the liver is reckoned from the ancients, former ages in this respect attached to it, by ascribing its functions powers and assuming it an important office in the process of assimilation. We cannot therefore be surprised to find a disease seated in this organ of a serious nature, reacting on the primary disease that produced it and combining with it still more effectually to prostrate the powers of the system. It is not uncommon in indigestion for a secondary disease to be relieved by another supervening on it. Hence it happens that inflammation of the liver is often relieved in an attack of the lungs supervening. This again is an important fact in the prognosis of the disease. Dyspepsia & hypochondriasis are the consequences of long continued indigestion, of a very old and obstinate character. Of the sympathetic analogy between the stomach and lungs there can be no doubt. The fact of asthmatic attacks occasioned by a disordered stomach, and relieved by a return of this organ to its healthy condition, is decisive of the question. We moreover often see a diseased state of the digestive organs,

produce cough and other pulmonary symptoms. This form of phthisis in an advanced state is attended with symptoms precisely similar to those of genuine tubercular consumption, and examinations post mortem show a condition of the lungs much the same as in other forms of phthisis; and in diagnosis however there is always superadded to the usual symptoms of phthisis, those indicating a deranged state of the digestive apparatus. It may be proper in this place, to add a fact of an interesting nature — that an affection of a part, independent upon a sympathy between itself and another part, being in the first instance merely a nervous affection, may be relieved by remedies applied directly to the part primarily affected; but if suffered to become of a more permanent nature and in the same proportion more independent of the original disease than for its removal, remedies must be applied to the part that is sympathetically affected: for example — in Hepatitis, one of the diagnostic symptoms is a pain extending to the shoulder; there is at first, no tenderness in this part, and it looks perfectly natural, without the slightest appearance of inflammation. But if the complaint is

[illegible] to volume, there will at least be an actual inflammation of the shoulder when the hand is felt, more or less bearing to the side, and the arm cannot be moved without producing an aggravation of the pain. I also in the female mammæ, proceed of from the irritation of worms in the intestinal canal, it has been found that those patients labouring under this complaint, to whom anthelmintics were administered, were in consequence freed from worms, recovered, the hepatic symptoms disappeared without any other remedy; while those in whom the disease was owing to the disease, or the worms in the mammæ were in number and shortest. Upon dissection there were discovered in such, several tubercular accumulations in the liver and lungs. The conclusion then is, that the symptoms of inflammation of the lungs were caused and kept up by the irritation of worms: the tumor removed, the symptomatic affection vanished; but when they were discovered to remain the symptoms continued in a genuine inflammation. These facts teach an important lesson in the treatment of many

sympathetic diseases. Reverting now to dyspeptic phthisis, we find that the cause existing not in the apparent seat of the disease but in a distant organ, the means of cure must be applied radically to influence the state of that organ, before any relief can be expected in the functional symptoms. But it is only in the commencement of this disease that a cure can be attempted with prospects of success, for if suffered to approximate in its nature to an original consumption of the lungs, it becomes like that, one of the opprobria medicorum. The connexion of gout with indigestion is now sufficiently ascertained. When a tendency to this disease exists, it may be induced by any cause disordering indigestion, and it has been a maxim, that a patient subject to gout, enjoys a longer interval between the fits, the more cautious he is in the use of the digestive organs. Its hereditary affection gravel, is not less from the same cause or indigestion. Dr Prout explains the manner in which indigestion induces and prepares, by deposing a crude state of the repro-

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[illegible] causes diminishing the bodily action, as thrown out of the
system by the skin and kidneys, and finally through
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our [illegible], had its commencement in the stomach. Dr. Chapman.
Dr. All the sympathetic affections of distant parts in indigestion,
none are so frequent as those of the head. One of the most common of

the symptoms of the first stage of intoxication are to be noticed. This stage is marked by a transient flush, [illegible] and mental excitement, a feeling of lightness or giddiness, [illegible] and [illegible] aspect than do [illegible] the eyes [illegible] with a peculiar stare [illegible] of [illegible] [illegible]. This [illegible] has been [illegible] out [illegible] - the patient [illegible] drunk, according to the [illegible] of the cause either in the stomach or brain, though it has been contended that it has been in very instances proved to arise from some affection of the stomach. It is [illegible] on these facts [illegible] that [illegible] of the [illegible] of [illegible] [illegible]. There is an attack of apoplexy may be removed by the application of powerful [illegible] to the head, and [illegible] immediately [illegible] it is a most formidable complaint. The immediate connexion of hydrocephalus internus with the stomach, through the [illegible] and [illegible] is now [illegible] by the best pathologists. It is not [illegible] that [illegible] proceeds from causes acting on the stomach; in many instances it undoubtedly arises from causes acting upon

tritus on the brain. We are inclined however that more of it is due to the causes than those acting on the digestive organs, their tendency is, indeed, will be given less to serve to the state of these organs; and that in a cases, prevention of improper state of the digestive organs, is the best means of prevention. I might here enumerate other minor and subsidiary affections connected with indigestion, but enough has been said to demonstrate it a disease of no common interest, involving, as it does, an organ so intimately connected with life and health. Indeed there can be no doubt, that Indigestion in different states and conditions, often gives rise to such an almost innumerable variety of anomalous symptoms, as to ape nearly every other disease.

The pathology of the stomach as concerned in fever, will next claim our observation. Various have been the theories advanced with regard to the production of crudities in the first stage of fever, at different periods in the history of medicine. And even in this enlightened age, we have seen not as much decision. The views entertained by our Professor of the theory and practice

[illegible] have a degree of [illegible] that entitles them to [illegible]. The doctrine he has hitherto inculcated on this subject is, that [illegible] [illegible], having for the most part the first link of its ultimate lengthened and complex chain in the stomach. Marsh miasma, the most prolific source of [illegible] with much appearance of truth and certainty, be traced as having its primary action on the stomach. What are the symptoms preceding an attack of fever but such as [illegible] [illegible] [illegible] [illegible] where are we [illegible] [illegible] but [illegible] the stomach and thence to the system at large. In yellow fever, which is esteemed by many as nothing more nor less than an aggravated form of the common bilious fever, produced by similar causes, only in a higher degree of concentration, and [illegible] in their operation by accidental circumstances, what are the most alarming symptoms but such as [illegible], prove inflammation of the stomach. Finally, what have dissections proved in this disease? Has the stomach been found to exhibit the most satisfactory

signs of inflammation. The black vomit, one of the most ominous of the symptoms of yellow fever is considered by Bancroft as nothing else than extravasated blood, the effect of the most violent inflammatory action. Admitting that bowels are sympathetic having their origin in common irritation, we are thus authorized to infer that it is most common the stomach to which this irritation is confined; therefore its entire obstruction and extensive derangements, the marked aversion common even to pure water, difficulties attend, involving finally the whole system. The sympathy existing between the stomach and skin is very remarkable. It has been ascertained that worms attendant with a disordered state of the stomach have proven also other intractable and contributory to the state of the skin, but which would readily yield as soon as the state of the stomach was attended to and a due performance of its functions restored. The whole of the exanthematic exhibit such data, as to convince of gastric origin, that to enter into any details on this point would be superfluous. A simple reference to the symptoms, phenomena or sensations and most of cure of these

diseases will suffice. They commence always with much disorder of the stomach, which is mitigated or entirely removed by the appearance of the eruption, and if from any exposure this eruption should suffer a sudden recession from the surface, a deadly sickness uniformly reverts. In those cases where it is susceptible of demonstration that the stomach is primarily affected, the same symptoms occur: as when from having eaten poisonous food the stomach becomes disordered, an eruption on the surface affords instant relief. Dissections shew in the exanthemata where no eruption has occurred, the mucous coat of the intestines marked with a species of erysipelatous inflammation; and such cases, (no relief being afforded by the cutaneous eruption) are always of a malignant nature. Dr Chapman observes that the feature of malignancy in disease is under all circumstances, derived from the stomach. By opposite states of this organ only, can the difference between the natural and inoculated small pox be accounted for. In the first form of the disease, the stomach is primarily affected by the direct application of the variolous matter to it, and

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hence the violent symptoms of casual small pox are produced. But in the inoculated form, the matter is applied to a portion of the skin, the sympathies of which, are comparatively weak, and in consequence the symptoms following are of a milder nature. I have thus enumerated a few of those diseases whose origin in the stomach admits of very little doubt. Many more might be added, for instance many of the neurose affections particularly Epilepsy, & Asthma and many others. But enough I hope has been said to demonstrate the relative importance of the stomach, and shew it to be a chief medium for the application of remedies in the removal of disease.

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